DOCUMENT RESUME

ED 261 071 TM 850 467

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TITLE A Cognitive Developmental Approach to Question Asking: A Distancing Model Analysis.
PUB DATE 2 Apr 85
NOTE 40p.; Paper presented at the Annual Meeting of the American Educational Research Association (69th, Chicago, IL, March 31-April 4, 1985).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Cognitive Development; Cognitive Objectives; Conflict Resolution; Developmental Stages; Elementary Secondary Education; Higher Education; *Inquiry; *Learning Theories; Models; Parent Child Relationship; Problem Solving; *Questioning Techniques; Structural Analysis (Linguistics); Teacher Student Relationship; *Teaching Methods
IDENTIFIERS Discrepancy Model; *Distancing Model (Sigel)

ABSTRACT

A conceptual model is presented for the development of thinking skills by using an instructional model employing high level cognitive demands. "Distancing" is proposed as the concept to denote behaviors or events that separate the child cognitively from the immediate behavioral environment. Forms and functions of distancing behavior are described. The conceptualization is a disequilibrium model where the teacher's questions create discrepancies and thereby activate the student to participate in the engagement. Activities which propel the student toward achieving a dynamic state of equilibrium seem to have a positive effect; effects at different age levels are discussed. The critical feature in applying this model is shown to be the quality of teacher questioning strategy. Examples are presented from transcripts of student-teacher interactions. (GDC)

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A Cognitive Developmental Approach to Question Asking: A Distancing Model Analysis[1]

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Paper prepared for the symposium, "Multidisciplinary Studies of Classroom Questioning and Discussion: Pedagogical Perspectives," at the meeting of the American Educational Research Association, Chicago, April 2, 1985.

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A Cognitive Developmental Approach to Question Asking: A Distancing Model Analysis

The aim of this paper to to discuss the role of question asking from the perspective of cognitive developmental theory.

The basic assumption guiding my perspective is that cognition develops among children in relatively well described stages (Piaget, 1950). Stage theory from a Piagetian perspective is essentially a structural model of cognitive growth wherein each stage describes the individual's organization of knowledge along with the kinds of logical-mathematical reasoning. At each level the developing child demonstrates differential understanding of the logical operations by which he/she acquires knowledge and is able to think and reason about events. Each stage describes how knowledge is acquired and what and how the child employs those mental operations by which he/she deals with quantity, relations, and classes. Basically, the child evolves from a sensori-motor orientation focused on actions to one where he/she is able to reason in more logical terms, make inferences, and deduce relations. In this way deductive, inductive, and analogous reasoning become possible.

Important as Piaget's contributions are to our understanding of cognitive growth, he merely acknowledges the role of social experience and interpersonal relationships as playing a crucial role in development. I contend that detailing of the role of social encounters is necessary since intellectual growth requires such exogenous stimulation.

To assert that exogenous stimulation is significant, however, does not further our understanding unless we can document the rationale for such an assertion and further provide in detail a description of such processes.

In this paper I will zero-in on the role of a particular class of events which activates, maintains, and furthers cognitive growth and in which question asking plays an important role. But first let me acknowledge some of the fundamental propositions upon which my case will rest. Following such a discussion I shall present my own theory and use the model to analyze the Dillon tapes.

One proposition that has guided my work on cognitive development is that such development proceeds as a function of mismatches between exogenous experiences and endogenous wishes, desires, interests or states. The mismatch might be referred to as cognitive conflict (Piaget, 1950) or discrepancy (Sigel & Cocking, 1979). I prefer the discrepancy construct because it is not overloaded with meaning from other theoretical perspectives, e.g., psychoanalysis or political science notions. Discrepancy is more neutral in connotation and will provide the appropriate heuristic for developing a dynamic model of cognitive growth.

Functionally, discrepancies are postulated as producing disequilibrium in the individuals--discrepant states which activate the individual to do something to recreate an equilibrated state. The actions that are required to recreate equilibrium may take many forms such as reorganizing one's perspective which involves assimilating new knowledge, or rejecting the validity of the new experience and hence expunging it as legitimate. Other mechanisms for dealing with disequilibrium will be discussed later.

The discrepancy-resolution thesis, however, requires further explication to make it amenable to empirical testing. Let me proceed by identifying types of discrepancy and defining events which generate discrepancies. Then I will proceed to demonstrate various ways of coping with the discrepancy.

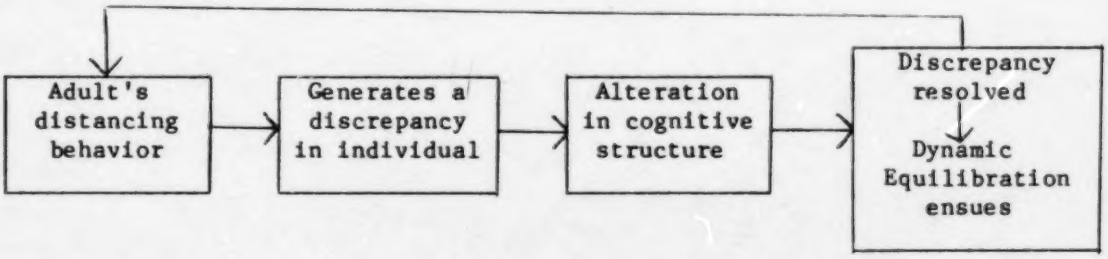
Types of discrepancy. It will be recalled that the generic notion of discrepancy is that it is a mismatch of two or more events. "Three types of discrepancies can be identified: (1) a mismatch between an internal state and an external event" (Sigel, & Cocking, 1979, p. 216), e.g., the individual wants to buy a new car and he/she does not have the funding; "(2) a mismatch between two internal events--an expectancy and an action are in conflict; and (3) a mismatch between two external events" (Sigel, & Cocking, 1979, p. 216), e.g., when an individual is given two sets of orders to be executed at the same time.

A discrepancy, then, can be said to be an exogenous-endogenous mismatch which the individual experiences as a violation of expectancies. Resolution of the discrepancy will occur when the individual alters his/her approach.

The discrepancy construct has been defined in terms of its formal properties, ignoring content. However, discrepancies can be identified in different content areas, which may require different modes of resolution. For now let me identify two specific areas--cognitive and affective. Cognitive discrepancies may involve logical mismatches, e.g., a child may be presented with a problem requiring logical inference, but he/she does not interpret the question as intended by the questioner; discrepancies may be in the affective domain, e.g., loving someone who does not reciprocate. No doubt one can enumerate a wide variety of content discrepancies. I shall have more to say about this issue later.

Sources of discrepancies. Discrepancies are, I believe, intrinsic to living and they occur in a planned or unplanned way during the course of one's existence. The type of discrepancies that are of interest in this presentation are those planned by social agents, especially parents or teachers with their children. The reason for focusing on this aspect of the

problem is because I believe it is through generating of discrepancy in children that adults contribute to children's cognitive growth. Discrepancies are generated by distancing behaviors. Distancing strategies refer to those classes of behavior which by their very function create discrepancies and resolution of the discrepancy resulting in cognitive change. Hence distancing strategies serve a mediating function which can be diagrammed as follows:



The Distancing Hypothesis

Distancing behaviors can be characterized as to their form, function, and determinants. Each of these characteristics contributes to the development of representational competence, the capability to represent social, physical, and personal realities, and the concurrent development of an understanding of the media of representation (pictures, verbalizations, and gestures). Distancing behaviors are actually stimulus situations for the child in that they:

> create temporal and/or spatial and/or psychological distance between self and object. "Distancing" is proposed as the concept to denote behaviors or events that separate the child cognitively from the immediate behavioral environment. The behaviors or events in question are those that require the child to attend to or react in terms of the nonpresent (future or past) or the nonpalpable (abstract language). (Sigel, 1970, pp. 111-112)

Although distancing stimuli (behaviors of others and events) can emanate from social and physical events, the focus in this chapter will be on verbal or gestural distancing behaviors, in effect, communication from others to the child. The verbal/gestural distancing behaviors comprise one subset of the general class "distancing stimuli," and manipulation of the physical and/or social environment comprises another subset. The purpose of this presentation is to emphasize the direct, social communicative network as the social context. The hypothesis is as follows: There is a class of events which effect representational thinking comprised of distancing behaviors.

Forms of Distancing Behaviors

The distancing behaviors in this presentation are verbal and as verbal events contain characteristic features of verbal communication, for example, content (meaning) and a syntactical structure.

Each distancing behavior is defined in terms of the "mental demands" presented to the receiver of the message (see Table 1). For example, a distancing behavior is labeled inferring cause-effect because the message for the receiver is to engage in inferential thinking to determine causal relationships. Perusal of the table will show the range of messages which demand representational and inferential thinking.

Insert Table 1 about here

The form of the communicative strategy can be either declarative or interrogatory. In the declarative statement, the sender "tells" the receiver something, for example, "This is a pen (pointing to a pen)," or

"The reason the rabbit went away is because the dog frightened him," a cause-effect statement.

Distancing strategies can also be interrogatories. A further distinction is made between questions which are for verification of messages already presented and questions which stimulate problem solving. The first type is the condition which could occur after a declarative statement has been made; for example, (a cause-effect statement), after reading a child a story the adult might say, "The reason the rabbit in the story ran away was that he was frightened." The child could then be asked, "Now why did the rabbit run away?" and the child could answer by reproducing part of the initial statement (e.g., "Because he was frightened").

On the other hand, question asking could take the form of an open-ended approach. Using the previous example, the adult might ask, "Why do you suppose the rabbit ran away? The child reconstructs the encounter.

Another feature of a distancing strategy is the "temporal" aspect. The time frame may be the contemporaneous present, the past, or the future. The time constraints reflect the anticipatory schema (future), reconstructive schema (past), or contemporaneous constructions. The various time constraints make different demands on the child. Anticipation requires organization of experience in the context of prediction or expectation, in contrast to the past, which requires an organization of previous experience with no projections into the future.

The temporal aspect of distancing is a crucial dimension since it is the coping with time that instigates representational thought. To reproduce or to reconstruct the past or to plan for the future requires mental representations.

Functions of Distancing Behaviors

Although distancing behaviors share the basic characteristic of a cognitive separation between the individual and the immediate present, they are presumed to vary in the degree and the way they activate this separation. The demand characteristics are contained in the message and the form. The function of the message is defined by the behavior as listed in Table 2, but the significance of the linguistic form is not to be overlooked, since structures of statements serve to affect mentations.

Insert Table 2 about here

Declarative statements, which demand convergent responses, require passive listening, in contrast to inquiry, which demands active engagement; for example, "The dog's name is Gimcrack" versus "What is the dog's name?" or "Can you tell me anything about the dog?" A declarative distancing strategy does not require the child to employ the same mental operations as an inquiry. In the former, the child receives the message, may retain it, processes it, and may or may not have to demonstrate understanding of the message. The inquiry strategy makes specific requirements for the child to engage mentally to answer the question.

The demand characteristics of open-ended inquiry, in particular, function as instigators, activators, and organizers of mental operations. The only way the child can answer a question is to become actively engaged, producing those mental activities demanded by the inquiry.

Table 2 is a summary of the forms verbal distancing often takes when adults attempt to instigate thinking in children. The form, whether declarative, imperative, or one of the interrogatives, is effective to a greater or a lesser degree according to the open endedness, so that requests for convergent responses ("Tell me the name of the dog") are less demanding in their reliance on representational thinking than are more open-ended discussion initiators ("Tell me more about the story.")

Functions of Questions

I have described the types of distancing stratgies. In this section I should like to develop further the analysis just of questions. However, the structure of questions should be conceptualized in terms of two additional categories: (1) the types of verbal response questions will elicit determined by their linguistic structure and (2) the psychological effects which questioning may elicit, especially affective states.

Beginning with the relationships between structure of the question and response, I contend that the linguistic structure generates "demands" that reduce the degrees of freedom of the respondent, not only in terms of content, but also in terms of cognitive demand. For example, asking a why question is intended to elicit an explanation, but also a justification. In effect a why question asks for two levels of

explanation--one in context and one in the psychic level, whereas a how question asks for a description of an event, but does not imply justification. Each question form: what, where, why, when, and who, engages a different mental process as well as different types of content. When is time oriented, where is location, and so on. Each interrogative arouses particular schema, e.g., time, place, person, etc. These interrogatives in themselves have cognitive implications and the responses are contingent on the developmental level of the respondent.

Respondent characteristics that must be considered include developmental level, intellectual level, verbal sophistication, context, and informational demands. For example, the same simple time question, "When did your mother bring you here?" will yield a different level of response from a five- and a fifteen-year-old--simply because the concept of time is differentially understood by the young child compared to the adolescent or the adult. This is not a vocabulary problem, but a conceptual one.

Using a Piagetian-type conceptualization, the cognitive level of a child is described by stage-like characteristics. For the child whose understanding of influences and causal connections, for example, is limited, questions requiring inferential reasoning will not be understood nor responded to as would the same question posed to an adolescent thinker who can think and reason in logical deductive ways. Another example is where the young child may be asked how a number of discrete objects are alike. The young child can usually use only one criteria, e.g., color, form, or function, whereas an older child is usually able to coordinate two or more attributes to build his/her class, e.g., color and form, or different functions. The ability to

generate hierarchical classifications is a function of the child's cognitive developmental level.

Parenthetically, I wish to point out that age is not the most reliable criterion to define cognitive stage. Rather, the quality of the individual's response should be used as the criterion. There is enough evidence to support the notion that the ability and the interest in logical thinking competence are not as frequent among adolescents and adults as one might think. Since this is the case, it becomes even more important that teachers, especially, shift criteria from age to students' functional cognitive level thereby structuring and phrasing their questions more appropriately.

In sum, then, each interrogative in and of itself generates a cognitive demand on a particular schema. The response of the child therefore has to be evaluated in terms of the developmental level and the child can only understand the question to the degree that he/she has a primary condition, a cognitive schema, which can be activiated by the interrogative.

Comprehension of the interrogative can interact with the remaining content of the question. The child may not understand the meaning of why, but know something about elements of the message, or the child may know the meaning of why, but not have the knowledge necessary to answer the question. The test for the inquirer is to be able to use the child's response as a clue to his/her understanding.

Every interrogative arouses affect to some degree--from mild to intense. The tendency, however, in much of the discussion of questioning is to minimize or ignore the affective aspects, especially when they are not obvious. It is obvious that a student can be

disturbed by the way a question is asked. But, I contend affect is intrinsic in any inquiry interaction however intense or mild and how apparent or not. Students may well mask feelings when asked questions. Difficult as it may be to identify such affective states, the inquirer must be sensitive and try to tune into the respondent's affective state. Chances are questions might be interpreted as hostile, disparaging, seductive or warm, friendly, supportive. Among the oft overlooked features of the inquiry process that foster the particular class of feelings are the intonation, the lexical structure of the question, the nonverbal cues (body language), and the timing of the question relative to other task assessment procedures.

In fact, I would go so far as to argue that questions that probe, that go beyond the superficial information seeking, generate tension. To be sure, tension can vary in intensity and comfort level as a function of how the questions are asked. One inquirer may generate distress because of tone and frequency intent to criticize or to destroy. The benign interrogator would present the question with an honorable intent and with hope to clarify. Between these polarities exists a broad range of inquiry styles which activate various emotional states.

Of course in most contexts, the issue of trust of the intentions of the questioner comes into play. In the extreme case, for example, in political contexts, the powerful inquisitor may deliberately use a quiet, seductive tone to demonstrate the she/he is trying to help. Often individuals can be misled by such soothing actions.

While various styles of interrogation serve different purposes, e.g., the prosecutor trying to trap a witness, the detective trying to

trap a suspect, I would suppose that for education there is an optimal style that while generating discomfort, the intent of the inquirer is not suspect and the tension generated is not destructive but rather, is adequate to activate the child cognitively. This arousal may be broadly considered affective.

Since questions have both a cognitive and affective quality, we might think of questions as multi-level stimuli. In some cases the term cognitive-affect complex may be in synchrony where the content is understood and moderate and affect arousal is moderate and appropriate or asynchronous where either the cognitive or affective features may be overplayed. A question with a seemingly benign cognitive demand but intense negative affective tone may preclude an answer. Conversely, a question might pose a difficult cognitive demand but the affective arousal tone may be benign. An example of the former might be where the five-year-old is asked, in a sneering tone, to tell about a trip he/she made "So, where did your parents take you yesterday?" or in a benign tone--somewhat monotone-like, to a very young child, "Can you tell me what was wrong with your grandmother when you saw her yesterday?" The tone in this case may be benign but the type of information requested may be too complex for the child. Hence he/she may turn away and not answer. Thus, the inquirer should be sensitive to the cognitive-affective featurs of a question.

My hunch is that the impact of any of these questions is greater when the question is a follow-up one rather than an initial question. In two studies done on cognitive-type inquiry, it was found that the significant psychological effect of inquiry is the effect of the follow-up question (Rosner, 1978). The initial question by itself seems

to be of less moment, perhaps because the discrepancy is not as apparent. When a question is answered and followed by another question, it might suggest to the student that the initial response was unsatisfactory and therefore the need to provide a more statisfactory answer is required. If the inquiry goes on, then the student may get increasingly dissatisfied and frustrated feeling he/she is always on the spot. Questions may inhibit learning rather than facilitate it because the intent of the inquirer is perceived as critical and non-accepting of the respondent's response. If the teacher answers a question with a question, the student wonders, "What did I say wrong?"

Distancing and Questioning Strategies: Some Considerations

To this point, the model I have presented appears as a rational approach where various types of behaviors have been classified in terms of their verbal structural properties with but passing attention paid to the affective features involved. In a sense, such an analysis decontextualizes the adult-child interaction from the inter- and intrapersonal features in a particular setting. To gain a broader perspective of the situation in which distancing behaviors are expressed, let me complement the previous discussion by placing the entire questioning strategy in a social context from an interactionist point of view.

I shall begin by describing an adult-child interaction, considering it initially as an abstraction before embedding the analysis in a particular social and physical setting.

Any observer of an adult-child interaction must be immediately struck with the obvious: the adult is larger, older, more experienced than the child and as a consequence has power--power to control material and psychological resources. The powerful adult plays many roles in the child's life in the

context of power. Not only does the adult control resources, the adult also judges when and how to dispense these resources. Distribution of material and psychological resources is at the discretion of the adult. The child's choices in this interaction are contingent upon what the adult allows the child to do. These structural and phenotypical actions describe the adult-child interactions in a "power" context, which I believe is indigenous to any adult-child context.

The description is in a sense an ideal, an ideal type in Redfield's sense of a type. However, there is a series of factors which play a significant role in setting constraints and directions of the quality of the adult's use of power. In previous research I studied the role of parents relative to a power relationship. I found that the way parents deal with their power potential depends on their conception of the child, on what are the sufficient and necessary ingredients for development, and what actions of the parent are needed for the appropriate outcomes to evolve.

From our own current research on parents' beliefs about children, for example, we find quite a variety of beliefs, ranging from beliefs that children learn through action on materials and exploring these materials, to beliefs that children learn through direct instruction (McGillicuddy-DeLisi, 1982; Sigel, 1985). The former beliefs may well be expressed in strategies that enable the child to be exploratory and to construct his/her own knowledge of the world through his/her own actions. In the latter case the child is the passive recipient of parental guidance. These are examples of how the parents expressed their power.

The term <u>teacher</u> can be substituted for the term <u>parent</u>, since in every interpersonal situation with any adult and child, the adult is nominally the power agent. The limits are due to personal decisions of expression and the

manner power is used. By using the general term adult, parents and teachers share similar roles. So, the results of my research, be they from parent or teacher studies, share similar implications.

The "power" issue may appear tangential if one focuses solely on the linguistic rational discourse. However, if one shifts the focus to the psychodynamic aspects of human interaction, then two relevant interactive dimensions immediately come to mind in the "power" context. These are the affective relationship including trust and the developmental level of the students.

Affect is inherent in every interpersonal transaction and inquiry interactions are no exception. Irrespective of the individuals involved, posing a question to an individual "puts him/her on the spot" because there is a cognitive demand to respond. Irrespective of how the question is phrased, it "demands" some response. Questions, to be sure, can vary in degree of "threat" or provoking anxiety. There is a close connection between the power role and affect arousal. Although I discussed the affective feature previously, in this section I would like to elaborate on it since it is an area too often overlooked or underemphasized.

Our contention, as previously stated, is that every question, no matter how psycholinguistically simple, can arouse affect. The particular affective response, of course, can vary. Questions posed by adults to children should be evaluated in the power context. For example, a teacher asking a child where he/she is going, or what his/her plans are, can be interpreted as intrusive and expression of power. An excellent example of this in the classroom is a teacher asking a child questions aimed at determining what the child knows or how he/she will go about solving a problem. Such questions, in effect, test the child's knowledge and challenge him/her to demonstrate

competencies. There is probably an implicit right and wrong answer here. Thus, the child may well become anxious or feel threatened. Such interrogatory situations are one-sided; the adult being the interrogator, coming from a position of power. Evidence for the one-sided power relationship can be found in the discourse. Let me ask, is a child entitled to the same privileges--asking teachers what they know and how they will go about solving a problem? Of course, it will be argued that some teachers encourage two-way questioning as will parents. However, the fact that the adult allows this type of interaction is an indication of power--the adult allows.

The way the argument has been presented suggests that the power factor is a deterrent to developing productive inquiry interactons. This is not necessarily the case. It is the recognition of the power factor that is a necessary first step toward generating a positive, meaningful and fruitful interaction.

Reduction of threat, discomfort and anxiety requires the establishment of a trust authentic inquiry situation. The "how to do it" is different for the teacher and for the parent. Since this paper addresses educational contexts primarily, examples with teachers will be used.

Affect arousal during an inquiry can be positive--the exicitement, the thrill, the enjoyment of partaking in an interesting discussion, or problem solving or problem defining. Or, affect can arouse feelings of threat, self, anxiety, a sense of powerlessness and similar negative states. This may be particularly the case since the child may feel that he/she is being evaluated.

Affect is aroused not only by the inquiry but by the context in which the inquiry process taskes place. Imagine a student being asked a question in a classroom setting and not knowing how to respond; or imagine a student struggling to articulate a problem solution, but not fast enough for either the teacher or follow students.

No doubt the readers can conjure up many situations in which either positive excitement or embarrassment and feelings of inadequcy have been aroused during an inquiry session.

Although little research has been done, to my knowledge, assessing the relationships between positive/negative affect and learning in an inquiry situation, the role of affect as a positive and/or negative factor can be deduced from analysis of the components of the context and our general psychological knowledge regarding relationships between positive (e.g., liking a subject, interest, etc) and negative (e.g., fear, anxiety, feelings of helplessness, etc.) affect.

Since inquiry can generate such a range of feelings, it behooves the teacher to be cognizant of how affect might influence student gains from inquiry.

The above discussion defined the affect-inquiry problem. Let me move on to a discussion of the role of affect in the distancing model which is, of course, the core of this paper.

The reader will recall that the theory holds that cognitive demands made by the adult to the child encourage the child to separate self from the ongoing concrete present. Distancing behaviors serve to activate or generate schema that involve reconstruction of the past, anticipation of the future, or disengaging from the ongoing present.

Distancing cognitive demands also indirectly require the child to separate "self" from the teacher. The child is in a sense "pushed" away by the logic of questioning and at the same time cognitively separating self. Perhaps an example will help clarify the issue. Imagine the following dialogue:

C: (painting with an easel) Every time I put my brush in the paint can and take it out it drips over the floor.

T: Can you think of any ways to stop the dripping?

C: (thinks to self--I want to paint my picture. Why is she bothering me?) No I can't.

T: What makes it drip?

C: I have too much paint on the brush.

T: What might you do to check that out?

The rest of this dialogue can be filled in by you, the readers. What is happening in this interaction is that the child has a problem which is merely instrumental--a means to the end--painting. The child asks for help, but the teacher used this situation as a "learning to problem solve" situation. The teacher's goal and the child's goal are in direct conflict. The teacher is diverting the child, frustrating his/her painting activity. One can imagine the child leaving the scene or ignoring the teacher and continuing on his/her own way. In either event, the teacher has activated feelings that can intrude in the primary activity of the child.

This example illustrates how the disregard for the child's affective status by the teacher can undo the educational opportunities in a situation.

It seems reasonable to suggest that the illustration provided above is a generic description of any power structured situation--whether the power is explicit or implicit: teacher-student, supervisor-supervisee,

principal-teacher. In a later section we shall suggest ways of preventing negative breaks in the dialogue due to emotional factors.

Distancing strategies not only can generate a sense of frustration when the child is interrupted during a task, but can also create distress when the teacher "bombards" the child with questions. Rapid-fire pacing of cognitive demands may overwhelm the child, in a sense suffocating him/her. Not allowing the child sufficient time to think, to reflect about what is asked of him/her, can also create distress. Further, such pressure may contribute to the child's sense of being rejected since the adult is not sensitive to the child's state.

Overall, distancing strategies can be perceived by the child as an interactive mode that "pushes" him/her away from the adult. After all, "If the teacher cares about me," thinks the child, "why is he/she not helping me but always asking questions?"

In conclusion, the emphasis on the emotional aspects of inquiry should not be underestimated--it is a double-edged factor. On the one hand it can undo the very process it is intended to achieve; on the other hand, it can create excitement and exhilaration in the process of discovery. It is incumbent on the teacher to become sensitive to these affective components by tuning in to the child's total response, by pacing the inquiry, and by noting when to back off. We find that only by such sensitivity responses on the part of the adult can the effort work.

Some Structural and Meaning Considerations

I want to touch on one issue that I believe needs reiteration and brings my discussion of inquiry and questioning into contact with two areas of support: structural linguistics and hermeneutics. Let me address each of these briefly.

As will be recalled, I stated that the form of the question is an important feature of the inquiry process. The reason this is the case is because how a question is posed and when it is presented, structures the response of the respondent. This relationship must be explored in depth because it contributes to clarifying the import of inquiry. Questions constrain responses in part due to the directive terms used. Of course, use of introductory terms by teachers presupposes the child truly understands the meaning of the wh terms and so can follow the directions. That is to say the teacher may introduce a question with why assuming the child is aware that "why" questions require justifications or cause-effect answers. If the child fails to answer the question, is it because he/she does not understand the meaning of why, or that he/she does not know or does not have an answer? Question users must be made keenly aware of the issue of the relationships between the child's knowledge and the structure of the question. The search for connections between the complexities of language and consequent thinking that evolves from linguistic interactions will, I believe, enhance our understanding of what there is about questioning that contributes to the development of thought--which is, of course, the basic goal of our collective endeavor.

In addition to the relevance of linguistic structural analysis, the role of meaning or interpretation of the question comes into play. The child has a meaning system, but whether or not it is shared with the adult is not known. The activation of the child's meaning system will also depend on his/her developmental level. For communication to transpire, i.e., for mutual understanding of the message, there has to be shared meaning. If this is not the case, then the student will not be able to engage appropriately in the discourse. In fact, it is likely the student will not profit from such

interaction. I have already indicated the need for inquiry interactions to be appropriately calibrated, but at that time I focused on comprehension as a function of affect state. Here I wish to emphasize the meaning aspects which may not only be directly related to the development level of the student, but also to non-developmental factors such as educational background, knowledge base, language background, etc. The lack of comprehension then may be due to a number of discrepancies in meaning or interpretation of a message or question. The dictum, define your terms in an argument, although a cliche, has truth because of the potential miscommunication that can occur if the meanings of terms are not shared. For example, consider many abstract nouns such as value, love, morality. Each has multiple meanings. Even everyday words can pose such problems. For example, in a study I was doing assessing children's conceptual level by using sorting tasks, I used a group of miniature representations of animals, furniture, vehicles and people. An eight-year-old girl grouped a number of items and gave as the reason, "They are all metal." Since there were other metal items she did not include, I asked, "What are metals?" The girl replied, "They are things that look like silver, shiny." I then pointed to an item that was brass and asked, "Could this be metal?" "No" was the response, "Metals are only shiny like silver." I concluded that the girl's definition of metal and the general definition did not totally overlap, i.e., my concept of metal and the girl's concept did have some common features, but the discrepancies were greater than the overlap. Her concept did not include the most generalized attribute defining metal. The girl understood the task, followed the instructions, but was limited in her knowledge of the critical attribute defining metal.

The meaning described above deals with the cognitive meaning components. In addition, however, there are meanings that related to such issues as the speaker's intention regarding any phases of the inquiry process, e.g., the speaker can be trying to influence the student subtlely, or motivating him/her, or trying to get the student to become aware of his/her limited knowledge. The question, as I said, at many times can serve many purposes in the context of the inquiry interaction. Each of these factors can play an important part in influencing the response and hence the inquirer must be alert to all these factors if the process is intended to promote thinking and learning.

In sum, inquiry, and the use of questions, is a complex task involving cognitive, social and emotional factors. Since the intention of inquiry strategies is to enhance learning of the student, then it behooves the inquiring adult to be sensitized to these issues. As we shall see in our review of the Dillon tapes, many questions were asked by teachers. I ask, did these questioning strategies help the student to increase his/her thinking skills? solve problems? I doubt it.

The conceptual framework I have presented describing distancing theory in general, and functions of questions in particular, forms a backdrop against which the practice of questioning can be derived. Three central propositions undergird my perspective: (1) cognitive growth proceeds through assimilative-accommodative processes activated by discrepancies arising from internal and/or external violation of expectations; (2) by appropriate use of inquiry, distancing strategies can generate discrepancies which can further cognitive growth; and (3) targeting questions for particular cognitive processes can enhance change laterally (i.e., expanding one's skills) and

vertically (i.e., contributing to movement from one cognitive stage to another).

This conceptualization, however, can be actualized if and when the inquiry process is skillfully executed. Let me outline some guidelines for "good" inquiry" deriving some of the rules from the above conceptualization.

What does it take for good inquiry and was only evident in the tapes?: A good inquiry teacher should, I believe, follow the following rules:

(1) A question must be asked for a reason, be it for information, diagnosis or to activate thinking.

(2) A question must be the target, i.e., the sequence should have the object or purpose of the question in mind.

(3) The question should be clear and appropriate to the developmental level of the child. This means the vocabulary level and the symbolic structure should contribute to clarity of the message.

(4) The question should be calibrated to a discrepancy--neither too easy nor to hard to get the child to think.

(5) The inquirer should listen to the response, both its manifest and its latent meaning.

(6) The inquirer should make certain he understands the response.

(7) The inquirer should be sure his/her questions move the discussion forward to an objective, but he/she should be aware when he/she has acquired the necessary information, i.e., know when to quit or shift to someone else.

Analysis of Dillon Tapes

Analyzing tapes with minimal contextual information is in some ways hazardous. Transcripts, however carefully edited, are decontextualized segments of interactions. Nevertheless, they do reveal noticeable

differences among the teachers, not only due to style, but also as a function of content.

What do we want to learn from this paper? From my perspective, I want to learn what the students learn from this interaction--i.e., learn not only content, but also how to think reflectively, how to analyze, and how to synthesize the information dealt with. Taba states an educational goal which I would offer as a basic purpose for inquiry and qustioning, to wit "to cultivate the type of mental processes which strengthen the capacity to transfer knowledge to new situations, the creative approaches to problem solving, and the methods of discovery and inventiveness" (Taba, 1962, p. 275). The distancing model I described in the foregoing section, I believe, can be used in order to achieve the above objectives.

Before proceeding to analyze the transcripts from an interactive perspective, I would like to make a few overall impressions.

Overall description of the tapes. Although each of the teachers engaged in discussion, only two of them employed a rigorous consistent inquiry-questioning strategy. They were HD and PG Even though they presented a problem to the group, the discussion of HD was loose and not focused. (I'll discuss this in detail later). The use of questions to solve or approach problems in the other interviews varied. Irrespective of the problem, I was hard-pressed to find consistent deliberate efforts at expanding the students' perspectives in terms of new knowledge or for generalizing their ideas to the situations.

A second issue relates to the degree to which the questioning "pushed" the students. For questions to foster students' thinking, the question should "demand" that the student reflect on what was said or how the answer moves toward problem solving, or at least, problem setting. That is to say,

does the question move the discussion forward or is it primarily asking the student for more information? If the latter, does this new information help deal with the problem? Overall, this was not clear in most excerpts.

Related to the above is the sequencing of questions. Sequencing refers to the relationship of Q2 to Q1, etc. For a discussion to move forward, each question should build on previous questions and responses from the students. Again in general, there seemed to be relatively little of this. PG was one of the few who seemed to move directly toward a predefined objective.

In sum, then, I will review these tapes with the following objectives:

(1) Does the teacher pose a problem and follow it through with questions which develop the argument?

(2) What types of questions are asked?

(3) What type of cognitive demands do the teachers make on students?

How are Problems Structured?

In most of the situations the teacher posed a problem that opened the discussion. In the Wb protocol the introduction is a transitional statement from previous problems. The introduction to the problem by HK is ambiguous, since two questions are posed, each having a different meaning. The first question was, "What was it that made him militarily successful?" followed by, "What was it about his strategy that enabled him to be successful?" Question No. 2 is more precise and is but one aspect of the problem as presented in Question No. 1. The subsequent discussion wavered between these two issues of "militarily" vs. "his strategy." The initial response of the student is a description of action, but I have a hunch HK wanted an explanation. However, the teacher's question, "Did you read anywhere in the book where an army was destroyed?" moves away from the initial problem and from then on the

discussion branches out into a number of directions. Further, the problems posed are cognitive, focusing on the students' knowledge.

A similar strategy is evidenced--PR's structuring is clear, "How are we going to help her deal with three (personalities)?" PR continues probing the "What can we do?" issue. There is no discussion, but the teacher seems to know the answer he/she wants. For example, the teacher is interested in "early history" and directs conversation accordingly. He shifts the discussion to other approaches after one model is developed (PR-27a).

MK presents a problem in terms of feelings of the students about an event in their direct experience. The discussion shifts from feelings about an event quickly to the issue of smoking. Is that the real issue or is it loss of privileges which has other implications, e.g., role of adult authority (1C)? From then on the discourse follows on two levels--argumentative and confrontational. This particular excerpt deals with a controversial issue, whereas the previous ones appear noncontroversial in structure.

The SN excerpt also deals with personal issues, opening with a "What" question regarding family patterns of discussions of sex, nudity, and physical affection. This is a discusson with exchanges of experience. It is as though discussion is the goal. The inquiry used gets children to elaborate their experiences.

In sum, HK poses a problem, but it proliferates to a number of issues which are not connected, nor developed one to the other. PR is the only teacher who uses the question directed toward problem solutions.

What kinds of inquiry strategies? The types of questions posed by the teachers seemed to vary as a function of teacher style and topic under discussion. Topics distant from personal experience tended to be more

analytical with questions. HK an PG reflect this approach. The discussion of Washington by HK tended to branch into episodes not following content-wise directly from the question answers (for example, "If they are destroyed, they're dead? And what if they are outsmarted?" Answer: "That means they could get by or move into better territory."). Subsequent interaction, Q12a, for example, is not connected to the previous discussion of Washington as a successful leader. The teacher "allows" this kind of dialogue. Analysis of the transcript into episodes reveals that there are few direct connections from one teacher-student interaction to another. PG, however, moves in a linear direction challenging the students to solve a problem. SN and MK's discussions are more of sharing experience rather than problem solving.

Let me return specifically to HK and follow through for each teacher. The topics that flow deal with strategies, draft, military draft, history of the military draft, allies, military tactics of allies, military aid of allies, etc. Thus, a broad discussion follows with little consistent follow-through. The types of questions were a mix of closed questions provoking little elabortion of the responses to why questions, which while appearing to be open-ended, tended to be relatively closed. The questions lacked focus during the discussion (e.g., "If the army is a volunteer army, as such, where did the people volunteer to?"). There was no response and the teacher rephrased the question to indicate that in fact he asked for a specific location to which these volunteers would have to go to.

Overall, HK's question tended to focus on a question-answer format focusing on acquired knowledge, rather than on problem solving. By switching topics, HK did not give students a chance to follow through on any one topic since questions for the most part asked for specific information, thereby tapping into a fixed knoweldge base of the student. In this way, little

opportunity was created for the student to get actively engaged as a thinker. Rather, the format was like a test.

By contrast, the Three Faces of Eve discussion which began with a clear structure, proceeded to follow through but questions challenged the student, e.g., "Then why couldn't Eve Black come out anytime she wanted to?" This was an error on the part of the teachers since Eve Black did that. The student corrected the teacher. After clearing up the issue of dominance, the teacher instructed the problem (10a). Students were asked to evaluate (11a) and predict consequences of recommended action (13A). The students are also asked to invent (15b). The dialogue throughout is with ongoing mild confrontation to justify a position (18a).

Overall, the entire record of PG reflects what I have called a distancing strategy approach. The students are encouraged to think through a problem within the predetermined structure.

One segment reflects an orderly discussion with considerable student participation (students' responses tend to be the longest in the set of protocols). However, the teacher does ask students to respond. There is no discussion among students--just from student to teacher. The topic structures the discussion which tends to stay on track. The teacher not only asks questions but also provides reflections and summative statements which promote the discussion.

The discussion on smoking proceeds in an orderly sequence since the initial problem, i.e., rules regarding smoking, reflects a multi-layered set of problems. The discussion raised questions of rules, rule enforcement, equality of rule application (teachers vs. students), hazards of engaging in "habit" and religious relevance. The progress in this discussion was fostered by the teachers pressing the students to explain (e.g., "Why can't

you smoke cigarettes at the school?") or to anticipate (e.g., What if question, etc.).

This record reveals "distancing strategies" specifically focusing on justification, posing contradictions, causal-connections, etc. The teacher also injects him/herself into the discussion by presenting self as a "case." Whether this is typical we do not know, but what is clear from the tape is the quality of the discussion. The issue is clear, there are no "correct" answers and the students are exploring questions regarding smoking at school. The teacher's style seems to have the students justify their positions rather than explore the bases of their ideas.

General Conclusions

My analyses of these transcripts have been in terms of questioning strategies relative to solving the problems provided by the teacher. Rather than focus on the dialogue per se, I looked at the larger educational context. I found that the questioning strategies varied as a function of the subject matter under discussion. However, it is not clear whether what was observed was a function of individual differences among teachers or whether it was a function of the subject matter. The contents are so varied that it is difficult to evalute. More research would need to be done to evaluate the issue, but it may well be the teaching styles will vary as the nature of the content varies. Some of the topics are distant for the students, e.g., assessment of Washington or proximal and ultimate (e.g., familial variations in discussing sexuality).

Perhaps more important is the variation in teacher goals. These were not clear from the transcripts. Were the teachers trying to get the students to develop thinking or problem solving strategies? Were they trying to get them to solve problems? Was the teacher "testing" the students?

From my theoretical bias, the value of questioning strategies in education is to facilitate learning. As I have discussed in the theoretical section on distancing, questions have the potential for encouraging students to become active thinkers. The question then becomes--"What strategies encourage students to engage actively in the learning process?" Many of the questions in these protocols that did reflect teachers' perspectives did not challenge the students. Few contradictions were posed, few questions sought evidence, and few questions were linked to previous aspects of the discussion to build a case. The teachers tended to be central to the discussion; peer interaction was not encouraged for the most part. Of course, I have no data on what knowledge or problem solving skills the students acquired. Judging from these records and assuming they are typical of these teachers, I would think that the students were not "mentally" pushed. This can only happen, I believe, when questions are so structured as to probe rationale, seek justifications and struggle with contradictions.

This latter assertion brings me back to the purpose of question asking as a teaching strategy. I do not intend to argue that the problem solving-thinking strategy approach is the only <u>legitimate</u> one. However, I do claim that questioning used with the intention of fostering thinking, and in my terms representational competence, will require a different strategy than using questions to test for students' knowledge and encourage emotional catharsis in verbal actions. These latter objectives could probably be met by employing open-ended questions with high frequencies for reflections of feelings and acknowledging students' affective states. In a sense, this latter strategy is a quasi-therapeutic approach.

Turning now to the use of questions as a goal for creating an environment in which students have to struggle a bit, to "think," and to reflect on their own and their peers' responses, requires a more disciplined strategy that was only minimally observed in the protocols and that was the discussion of Three Faces of Eve, is probably closest to the model I am recommending. Such a teaching strategy is not easy and places heavy demands on the teacher to be alert, to be a step ahead of the student, to develop a repertoire of examples, anecdotes, etc. to make a point. Perhaps more important, the teacher must be a master of the subject matter, especially among middle and high school students. With knowledge of subject matter and with skill in using inquiry, I believe students can profit greatly in subject matter knowledge and ways to think about it.

The challenge facing the advocates of inquiry as a tool for developing representational competence is to test basic hypotheses in an educational setting. My own research with parents and young children has demonstrated that parents' use of distancing strategies (which include inquiry) does relate to children's representational competence and problem solving skills (Sigel & McGillicuddy-DeLisi, 1984). Further, similar findings were found for children enrolled in a nursery school setting where the teachers were trained to use distancing strategies. In these studies, higher level distancing strategies did in fact contribute to children's representational competence.

Redfield and Rousseau (1981) undertook a meta-analysis of educational studies in which teachers employed higher cognitive demands and concluded, "regardless of type of study or degree of experimental validity, teachers' predominant use of higher cognitive questions has a positive effect on student achievement" (p. 244). Further, these authors conclude that,

"students who participate in programs where teachers are trained in questioning skills and in which the validity of program implementation is carefully monitored, gains in achievement can be expected when more higher cognitive than lower cognitive questions are used during instruction" (Redfield & Rousseau, 1981, p. 244). These findings are consistent with Sigel & McGillicuddy-DeLisi's (1984) results, where lower order distancing strategies were found to relate negatively to intellectual performance.

These results then attest to the justification of advocating teachers' use of high level cognitive questions. In reviewing the protocols from the Dillon tapes, however, there are relatively few high level cognitive demand questions posed by any of the teachers.

Summary

In this paper I have presented a conceptual model for the development of thinking skills where an instructional mode employing high level cognitive demands is employed. The conceptualization is a disequilibrium model where questions create the disequilibrium and thereby activate the individual to participate in the engagement. Activities which propel the student toward achieving a dynamic state of equilibrium seem to have a positive effect. The critical feature in applying this model is the quality of teacher questioning strategy.

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Footnotes

[1]Portions of this paper are taken from Sigel and Cocking, 1979. Part of the research reported in this paper was supported by the National Institute of Child Health and Human Development Grant No. R01-HD10686 to Educational Testing Service, National Institute of Mental Health Grant No. R01-MH32301 to Educational Testing Service, and Bureau of Education of the Handicapped Grant No. G007902000 to Educational Testing Service.

Table 1

Distancing Strategies[a]

To observe[b]	Asking the child to examine to observe, e.g., "Look at what I am doing."
To label	Naming a singular object or event, e.g., naming a place, person, alternate. No elaboration. "What color is the block?" "Where is Joel?"
To describe	Providing elaborated information of a single instance. Descriptions are static; provide no dynamic relationships among elements, no use and functional characteristics. "What did the car look like?"
To sequence	Temporal ordering of events, as in a story or carrying out a task. Steps articulated; last, next, afterwards, start, begin are possible key words. "First we will look at the pictures, then we will make up a story." Teacher telling, "Your turn is after Paul's." "Are you next?" (sometimes confused with structuring, as in "Paul, it's your turn.")
To reproduce	Restructuing previous experiences, dynamic interaction of events, interdependence, functional. "How do you do that?"
To compare	Noting (describing or inferring) characteristics or properties.
(a) Describe similarities	Noting ostensive common characteristics (perceptual analysis) "Are those the same?"
(b) Describe differences	Noting ostensive differences among instances (perceptual analysis). "In what way are the truck and airplane different?"
(c) Infer similarities	Noting nonobservational commonalities (conceptual).

(Table continues)

Table 1 (continued)

(d) Infer differences	Noting nonobservable differences (conceptual).
To propose alternatives	Offering different options, different ways of performing a task.
To combine	
(a) Symmetrical classifying	Recognizing the commonalities of a class of equivalent instances. "Why did you put those two together?"
(b) Asymmetrical classifying	Organizing instances in some sequential ordering--seeing the relationship as a continuum, seriation of any kind, comparative, where each instance is related to the previous one and the subsequent one, relative (big to small, more or less).
(1) Enumerating	Seriation: enumerating of number of things unalike; ordinal counting (1, 2, 3, 4, 5). "Count how many there are." "Is this tree bigger than that one?"
(c) Synthesizing	Reconstructing components into a unified whole; explicit pulling together; creating new form, sum of a number of discrete things.

[a]This is not an exhaustive list of strategies.

[b]Each strategy is a "demand" for the child to engage in particular operations which are inherent in the structure of the statement. The "demand" quality is implicit in the strategy. The form of the strategy may vary (see Table 2). The singular examples listed here are illustrative and not to be construed as exhaustive.

Table 2

Structural Characteristics of Distancing Behaviors

			Interrogatory			
Statement	Type	Declarative	Direct	Indirect	Intonation	Imperative
Closed	convergent	The boy is upset because his dog ran away.	How did the boy feel when his dog ran away?	I wonder if the boy was sad when the dog ran away.	The dog ran away. The boy was sad.[a]	Tell me why the dog ran away.
Open	divergent	There are other ways the boy could feel when his dog ran away.	What can you tell me about the boy and his dog?	The dog ran away. I wonder how the boy feels.	The dog ran away and you said he is sad about it; he might have some other feelings.[a]	Tell me about the boy and his dog.[b]

[a]The interrogatory is reflected in the intonation.

[b]The difference between declaratives and imperatives is intonation as well as syntactic structure.